Vasectomy and vasectomy reversal : development of newly designed nonabsorbable polymeric stent for reconstructing the vas deferens

Vrijhof, Henricus Joesphus Elisabeth Johannes

Chapter 4

Vasovasostomy results in 66 patients related to obstructive intervals and serum agglutinin titres

H.J.E.J. Vrijhof and K.P.J. Delaere

Department of Urology, De Wever Hospital, Heerlen, The Netherlands

Urologia Internationalis 1994; 53:143-146

Introduction

Vasectomy is a very popular form of birth control. The request for vasovasostomy procedures is growing due to the increasing prevalence of divorce and remarriage. However, the number of reversal procedures in this hospital has not increased over the last decade. The aim of the study was to investigate the results of vasovasostomy procedures in relation to duration of obstruction and preoperative serum agglutinin titres. Obstructive interval is defined as the period between vasectomy and refertility. In previous studies the correlation between obstructive intervals and pregnancy rates has been demonstrated [1, 2]. Especially in the study of Kabalin and Kessler [2] a 5-year obstructive interval seems to be a critical barrier in achieving acceptable pregnancy and patency rates. Even with obstructive intervals exceeding 10 years, pregnancy can still occur [1].

Materials and Methods

A total of 82 primary vasovasostomy procedures were performed between January 1983 and December 1991 and 66 patients were admitted to the study. Sixteen patients were lost to follow-up. Average age was 37 years (26-59) and the mean follow-up was 54 months (5-105). After the medical history had been obtained and clinical examination (to exclude sperm granulomata) had been carried out, sperm agglutinating antibodies in serum were determined by means of a standard tray agglutination test (TAT). In this procedure, heat inactivated serially diluted samples were incubated with donor sperm. These samples were then placed in microchamber trays under paraffin oil at 37°C. After 2 h the results were read using an inverted microscope.

Obstruction intervals were subdivided in categories varying from 0-2, 2-5, 6-10 and more than 10 years after vasectomy. Bilateral vasovasostomy was performed in 62 patients. One patient

underwent a unilateral reversal procedure and in 3 others a bilateral vasoepididymostomy was carried out.

The patients were operated on by different surgeons and the macroscopic procedure was more often performed than the microscopic (62% vs. 38%). All the anastomoses were constructed with double-ended prolene 7.0 one-layer sutures. Microsurgical vasoepididymostomy was performed by using an end-to-end anastomotic method. In 53% (n = 35) of the patients an internal splint running through the anastomosis of the vas deferens and leaving the scrotum, was left in situ for 24 h. Postoperative semen analyses were determined 2 months, 6 months and 1 year after reversal or until pregnancy occurred. Sperm counts were subdivided into 4 groups: 0, < 10, 10-20, > 20 millions/ml. Those patients who had recurrence of sperm in the semen after a 1-year follow-up, but had not reported pregnancy, were contacted by telephone.

Results

There were various reasons for regaining fertility. In 50% (n = 33) of all cases the desire to have a child with a new partner, resulting from a previous divorce, was reason for a reversal procedure. The wish to have more children within the same marriage accounted for 35% (n = 24) see (table 1).

Table 1. *Reasons for vasectomy reversal*

	Patients	
	n	*%*
Divorce and remarriage	33	50
Child died	3	5
Wife died	3	5
Desire for (an) additional child	24	35
Other	3	5

Patency was described as the recurrence of sperm in the ejaculate after vasal reconstruction. Postoperative sperm counts were correlated to duration of obstruction (table 2).

Table 2. *Obstructive interval compared with postoperative sperm concentrations in 66 patients*

Obstructive interval years	***n***	***Sperm concentrations, million/ml***			
		0.10^6	***<10^6***	***10-20. 10^6***	***>20.10^6***
0-2	3	-	-	1(33%)	2(67%)
2-5	28	-	6(21%)	6(21%)	16(58%)
6-10	27	7(26%)	5(18%)	3(11%)	12(45%)
>10	8	3(37.5%)	3(37.5%)	-	2(25%)

As the latter became shorter the mean sperm count rose significantly. The fact that a patency rate of 100% occurred if the time to reversal was less than 5 years (fig. 1) was a remarkable finding. As the obstruction period became longer, the number of failures rose. An overall patency rate of 84.8% was achieved. Taking a 5-year obstruction interval under review, a pregnancy rate of approximately 67% (fig. 1) was obtained. Obviously there is a clear discrepancy between patency and pregnancy rates probably due to low postoperative sperm counts and/or circulating antisperm antibodies. Nevertheless, pregnancy occurred in 25% (2/8) of the patients with obstructive intervals of longer than 10 years.

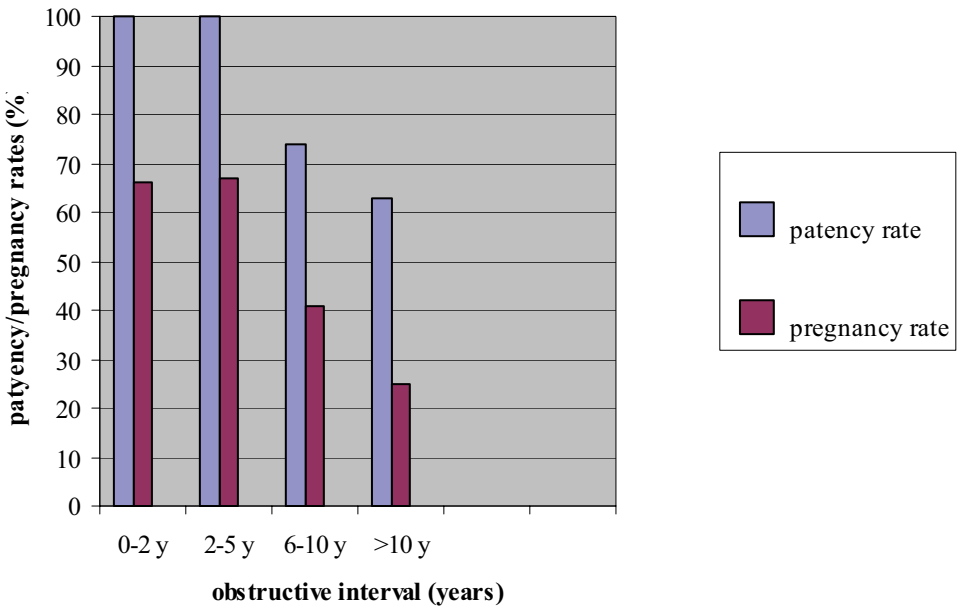

Fig 1. *Obstructive interval versus patency and pregnancy rate in 66 patients*

Preoperative antisperm antibodies in serum were determined in 35 patients. Despite the fact that a limited number of patients were studied, it seemed obvious that there was a correlation between the titre and the appearance of pregnancy after reversal (table 3). With serum agglutinin titres of < 1/32 there was a significantly better chance of obtaining pregnancy. Nevertheless, pregnancy occurred in 23% (3/13) of the patients with an agglutinin titre of 1/64. No pregnancies were recorded from the 2 patients with agglutinin titres of 1/256.

Table 3. *Preoperative serum sperm agglutination titres correlated with pregnancy rates in 35 patients*

Agglutination Titres	***Patients***	***Pregnancies***	
		n	***%***
Negative	10	8	80
1/4	4	2	50
1/16	3	2	66
1/32	3	nil	nil
1/64	13	3	23
1/256	2	nil	nil

Discussion

This study illustrates once more that there is an obvious relation between the duration of the obstructive interval and postoperative pregnancy rates. Previous studies have illustrated the same phenomenon. Silber [3] indicated in his study in 1977 that patients with intervals of 10 years or more had poor chances for fertility. Nevertheless, we believe that such long intervals should not deter a surgeon from performing a reanastomosis. An important prognostic factor is whether the vas fluid coming from the testicular vas end contains spermatozoa. Belker and Bennett [4] suggested that the fluid obtained intraoperatively from the testicular vas end should be examined microscopically to decide whether vasovasostomy or vasoepididymostomy should be performed. In this series we only observed macroscopically if fluid was coming from the testicular end and no microscopical examination was carried out. The use of an internal splint during the operation has frequently been discussed. Several studies reported on the use of an absorbable polyglycolic acid tube stent in rats and dogs [5, 6]. There seemed to be a superior re-epithelialization and closer return of the vas to normal morphology in polyglycolic stented anastomoses, than in anastomoses created with the conventional two-layer technique.

Reduction of perivasal inflammatory reaction (probably due to sperm leakage), ease of anastomosis with satisfactory approximation of vasal ends and maintaining luminal patency, are several other advantages claimed for with this stent. In the present series a prolene 0 wire was used as a splint and it was carried up through the proximal end of the vas deferens and then led into the distal part where it left the vas transmurally through a hollow medical needle. In this way the creation of the anastomosis with double-ended prolene 7.0 was facilitated. The use of a carbon dioxide (CO2) laser in creating an anastomosis has been previously described by several authors. Rosemberg [7] presented his results with this technique in 1988. He demonstrated postoperative sperm counts of over 20 million/ml in 86% of the patients and a pregnancy rate of 43% in the group of patients operated on within 10 years of the vasectomy.

The influence of antisperm antibodies upon fertility after vasectomy is a well-known phenomenon. Matson et al.[8] noticed the fact that conception rates were reduced in those couples in whom the presence of IgG or IgA+IgG antisperm antibodies occurred in seminal fluid. Meinertz et al.[9] also stressed the finding that especially the occurrence of 19A in the seminal fluid was associated with low conception rates. Aitken et al. [10] described the capacity of antibodies to stimulate or suppress sperm/oocyte fusion. In vasovasostomized patients they saw a higher stimulating effect on this fusion than in patients with primary infertility. In their series they observed no correlation between the titre of antisperm antibodies and the ability of these antibodies to influence sperm function.

The significance of white blood cells in the ejaculate remains a point of further investigation. Barratt et al. [11] documented the white blood cell types in the ejaculates of vasovasostomized men and noticed that those men without antisperm antibodies had a predominance of suppressor/cytotoxic T cells over helper/inducer T cells. Witkin and Goldstein [12] also viewed the fact that a decrease in suppressor/cytotoxic T cells may lead to a condition in which the formation

of antisperm antibodies is stimulated. Broderick et al.[13] investigated the immunological status of 55 patients before and after vasectomy reversal. Those men who had greater quantities of sperm-surface antibodies in their vasal fluid had significantly lower motility percentages.

Spermatic granulomas are thought to have a certain impact on the development of immobilizing antibodies. Alexander and Schmidt[14] performed a study on 77 vasovasostomized men and found more sperm-immobilizing antibodies in patients with granulomas than in those without. In the previously mentioned study of Broderick et al.[13], only 2 out of 12 patients (with significant sperm-surface antibodies) had granulomas. In a review article by Cos et al.[15] the presence of a sperm granuloma at the site of ligation after vasectomy might be interpreted as a pressure relief valve. Those patients, who underwent a reversal procedure, including removal of their granulomas before reanastomosis, had an explicit good quality sperm in their ejaculum.

These studies illustrate once more that the opinions on this subject still differ. We maintain our policy of performing reversal procedures even in patients with considerably raised preoperative serum titres of antisperm antibodies.

References

1. Belker AM, Thomas AJ., Fuchs EF, Konnak JW, Sharlip ID: Results of 1,469 microsurgical vasectomy reversals by the vasovasostomy study group.
   J Urol 1991; 145:505-511.
2. Kabalin IN, Kessler R: Macroscopic vasovasostomy reexamined.
   Urology 1991; 38:135138.
3. Silber SJ: Pregnancy after vasovasostomy for vasectomy reversal: A study of factors affecting long-term return of fertility in 282 patients followed for 10 years.
   Human Reprod 1989; 4: 318-322.
4. Belker AM, Bennett AH. Applications of microsurgery in urology.
   Surg Clin North Am 1988; 68: 1157-1162.
5. Flam TA, Roth RA, Silverman ML, Gagne RG: Experimental study of hollow, absorbable polyglycolic acid tube as stent for vasovasostomy.
   Urology 1989; 33:490-494.
6. Berger RE, Jessen JW, Pat ton DL, Bardin ED, Bums MW, Chapman WH: Studies of polyglycolic acid hollow self-retaining vasal stent in vasovasostomy.
   Fertil Steril1989; 51 :504-508.
7. Rosemberg SK: Further clinical experience with CO2 laser in microsurgical vasovasostomy. Urology 1988; 32:225-227.
8. Matson PL, Junk SM, Masters RW, Pryor JP, Yovich JL: The incidence and influence upon fertility of antisperm antibodies in seminal fluid following vasectomy reversal. Int J Androl1989; 12:98-103.

9. Meinertz H, Linnet L, Fogh-Andersen P, Hjort T. Anti-sperm antibodies and fertility after vasovasostomy: A follow-up study of 216 men. FertilSteril1990; 54:315-321.

10. Aitken RJ, Parslow JM, HargreaveTB, Hendry WF: Influence of antisperm antibodies on human sperm function. Br J Urol 1988; 62:367-373.

11. Barratt CLR, Harrison PE, Robinson A, Cooke ID: Antisperm antibodies and lymphocyte subsets in semen -Not a simple relationship. Int J Androl 1990; 13:50-58.

12. Witkin SS, Goldstein M: Reduced levels ofTsuppressor/cytotoxic lymphocytes in semen from vasovasostomized men: Relationship to sperm autoantibodies.
J Reprod Immunol 1988; 14:283-290.

13. Broderick GA, Tom R, McClure RD: Immunological status of patients before and after vasovasostomy as determined by the immunobead antisperm antibody test.
J Urol1989; 142:752755.

14. Alexander NJ, Schmidt SS: Incidence of antisperm antibody levels and granulomas in men. Fertil Steril1977; 28:655-657 .

15. Cos LR, Valvo JR, Davis RS, Cockett ATK: Vasovasostomy: Current state of the art. Urology 1983; 28:567-575.